

On some new or rare Crustacea from Scotland. By THOMAS SCOTT, F.L.S., Naturalist to the Fishery Board for Scotland, and ANDREW SCOTT.

[Plates XI.-XIII.]

COPEPODA.

Diosaccus propinquus, sp. n. (Pl. XI. figs. 1-6.)

Female.—Length, exclusive of caudal setæ 1 millim. ($\frac{1}{25}$ of an inch). Body moderately robust. Anterior antennæ eight-jointed, the first four joints stout, subequal, the last four slender; the combined length of the last four is equal to nearly two thirds of the combined length of the first four; the proportional lengths of the joints are shown by the formula—

14	14	12	15	8	12	5	9
1	2	3	4	5	6	7	8

Posterior antennæ comparatively short and stout, secondary branch two-jointed (fig. 3). Mandible-palp one-branched, two-jointed as in *Diosaccus tenuicornis* (Claus), but the end joint is much narrower than, and only about a third of the length of, the basal joint. The maxillæ and anterior foot-jaws are nearly as in *Diosaccus tenuicornis*. The posterior foot-jaws are stout and the terminal claw is as long as the

joint from which it springs. The first three pairs of thoracic feet are nearly as in *Diosaccus tenuicornis*, except that a stout plumose seta springs from the basal joint of the first pair, and the outer branches of the same pair are fully half the length of the entire inner branches exclusive of the terminal claws (fig. 4). Inner branches of the fourth pair two-jointed, slender, and shorter than the outer branches. Basal joint of the fifth pair subquadrate and furnished with four subterminal plumose setæ; secondary joint broadly ovate, extending considerably beyond the basal joint and bearing six setæ—two small ones at the apex, one plumose seta of moderate length on each side of the apex, and two small ones on the outer margin (fig. 6). Caudal stylets as long as the last abdominal segment. Ovisacs two.

Hab. Moray Firth, a few miles northward of Kinnaird Head, 130 fathoms.

Three specimens only were obtained, all females.

Remarks. This species closely resembles *Diosaccus tenuicornis* (Claus), but the anterior and posterior antennæ are shorter and stouter, the outer branches of the first thoracic feet are proportionally longer, the inner branches of the fourth pair are only two-jointed, and the secondary joints of the fifth pair are ovate and extend considerably beyond the basal joints.

Laophonte littorale, sp. n. (Pl. XI. figs. 7-14.)

Length .85 millim. ($\frac{1}{30}$ of an inch). Body elongate, sub-cylindrical, forehead slightly produced and bluntly rounded. Anterior antennæ sparingly setiferous—in the female seven-jointed, the third joint longer than any of the others, while the fifth is very short, as shown by the formula—

$$\begin{array}{r} \text{Female anterior antennæ.} \quad 9 \cdot 10 \cdot 12 \cdot 5 \cdot 3 \cdot 6 \cdot 8 \\ \hline 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \end{array}$$

In the male anterior antennæ the fourth joint from the end is considerably dilated, the following joint is distinctly hinged to the fourth; the penultimate joint is very short, and the last forms a stout grasping claw. The secondary branch of the three-jointed posterior antennæ is rudimentary, and consists of one small joint bearing an apical seta. The mouth-organs are nearly as in *Laophonte curticauda*, Boeck. The outer branches of the first thoracic feet, which consist of three subequal joints, are equal to about half the length of the inner branches exclusive of the terminal claw. The inner branches

of the first four thoracic feet are all two-jointed; the fourth pair in the female and male are dissimilar—those of the female do not differ much from the others except that they are rather shorter and stouter, but in those of the male the inner branches are almost obsolete, being reduced to two minute joints, while in striking contrast to these the outer branches are robust and are armed with several stout spines in place of setæ; the first joint of the outer branches is considerably longer than the next two together (fig. 12). The fifth pair in the female have both joints broadly foliaceous and subquadrate, and bear a number of strongly plumose terminal setæ; in the male the fifth pair are rudimentary and consist of a slightly produced basal portion carrying four setæ, in addition to a small spine-like seta on the inner margin (fig. 13). The caudal stylets are covered with cilia, and are about two and a half times longer than broad and equal to one and a half times the length of the last abdominal segment.

Hab. In pools of brackish water at the mouth of a small stream at Luffness, Firth of Forth, and in similar pools at the mouth of the river Alness, Cromarty Firth. Not very rare.

Remarks. *Laophonte littorale* resembles *Laophonte curti-cauda*, Boeck, in some respects, but differs very markedly in the structure of the fourth thoracic feet of the male (the outer branches are, however, somewhat similar to the outer branches of the third pair of the male of that species, but the proportional lengths of the joints are different). There are other, though less obvious, differences between the two species, as, for example, in the structure of the first thoracic feet and of the male fifth feet. The species appears to be confined to water that is more or less brackish.

PSEUDOCLETODES, subgen. nov.

Resembling *Cletodes*, Brady, in general appearance, but the inner branches of the first thoracic feet are obsolete or rudimentary; inner branches of the second, third, and fourth pairs two-jointed, the first joint very small.

*Pseudocletodes vararensis**, sp. n. (Pl. XII. figs. 4-14.)

Length 1.14 millim. ($\frac{1}{22}$ of an inch). Rostrum prominent, moderately broad, with a minute hair on each side of the

* Εἰσχωρίς Οὐάραρ (Æstuary of Varar), the name used by Ptolemy for the Moray Firth.

triangular apex. Body narrow, tapering slightly and evenly to the caudal extremity (fig. 4). Anterior antennæ (female) six-jointed, stout, each of the third, fifth, and sixth joints armed with a strong setiferous spine on the upper aspect; the upper distal angle of the third joint is produced and forms the base of a stout olfactory appendage; the formula shows the proportional length of the joints—

$$\text{Female anterior antennæ. . } \begin{array}{cccccc} 9 & 10 & 8 & 3 & 4 & 10 \\ 1 & 2 & 3 & 4 & 5 & 6 \end{array}$$

Posterior antennæ somewhat similar to those of *Cletodes linearis*, Claus, but rather shorter and stouter. Mouth-appendages also somewhat similar to those of that species. Inner branches of the first thoracic feet obsolete and replaced by a dagger-shaped setiferous spine; the second joint of the outer branches is furnished with a small plumose seta on the inner edge and a stout conical spine springs from the outer distal margin of the first and second joints, while the third joint is provided with five spiniform setæ round its extremity and outer edge (fig. 9). The inner branches of the next three pairs are nearly alike, except that those of the second and third pairs are rather longer than the first two joints of the outer branches, while those of the fourth pair scarcely reach to the end of the second joint; the inner branches of the third pair in the male are slightly shorter than in the female, and armed with a terminal conical spine, as shown in the figure (fig. 13). Caudal stylets broad, subovate, nearly straight on the outer edge and convex on the inner, and provided with a few small lateral and terminal setæ.

Hab. Among *Filograna implexa*, brought up in the trawl-net in the Moray Firth.

Remarks. In form and in many of its details this curious species is closely allied to *Cletodes*, but the remarkable structure of the first thoracic feet is so much at variance with the characters of that genus as to render its position in *Cletodes* untenable.

PSEUDANTHESSIUS, Claus.

This genus of the Lichomolgidae is distinguished from its allies by the structure of the mouth-appendages, and especially of the fourth pair of thoracic feet, the inner branches of which are one-jointed (fig. 20). Two British species of *Pseudanthessius* have already been described, viz. *Pseudanthessius liber* (B. & R.) and *Pseudanthessius Thorellii* (B. & R.)*. We have now to record a third species, which

* Mon. Brit. Copep. vol. iii. pp. 44 and 47.

was obtained by carefully washing some masses of *Filograna* trawled in the Moray Firth.

Pseudanthessius gracilis, Claus. (Pl. XII. figs. 15-20.)

Pseudanthessius gracilis, Claus, Arbeit. zool. Inst. Wien, 1889, vol. viii. p. 344, Taf. iv. figs. 1-7.

Length 1·3 millim. ($\frac{1}{19}$ of an inch). First body-segment rather longer than broad, gently curving toward the rounded forehead; last thoracic segment scarcely broader than the slender abdomen. Anterior antennæ not reaching to the end of the first body-segment, seven-jointed, the third and last joints much shorter, as shown by the appended formula—

$$\begin{array}{cccccccc} 17 & . & 20 & . & 8 & . & 14 & . & 16 & . & 13 & . & 9 \\ \hline 1 & & 2 & & 3 & & 4 & & 5 & & 6 & & 7 \end{array}$$

Secondary antennæ four-jointed, third joint very small, the last provided with one plain and four elongate and geniculate spiniform setæ. Mandibles stout, produced to an acute apex, inner margin evenly convex, middle portion of the exterior margin ciliate. Maxillæ simple, bearing three apical setæ (fig. 17). Anterior foot-jaws slender, armed with a few strong teeth on the upper edge; a plumose seta springs from the inner edge near the base of the foot-jaw. Posterior foot-jaw three-jointed, second joint somewhat dilated and bearing a stout spiniform seta near the middle of the inner aspect; the last joint very small and terminated by a stout conical spine and a spiniform seta about three times longer than the joint from which it springs (fig. 19). Inner branches of the first three pairs of thoracic feet three-jointed; inner branches of the fourth pair one-jointed and scarcely reaching to the end of the second joint of the outer branches, and armed at the truncate apex with two dagger-shaped spines; the inner branches are without setæ, but there is a small hook-like process near the middle of the inner margin (fig. 20). Fifth pair small, subquadrate, attached to the produced angles of the last thoracic segment, and provided with an elongate dagger-like spine and a plain seta at the apex, and a small seta near the articulation of the joint with the thorax. The first abdominal segment is about equal to the combined length of the next three and is somewhat dilated towards the distal end. Caudal stylets equal to about twice the length of the last abdominal segment; a small seta springs from near the middle of the outer edge of each stylet in addition to the terminal setæ.

Hab. Also among *Filograna*, from the Moray Firth. Several specimens were obtained.

Remarks. This species somewhat resembles *Pseudanthessius Thorellii* (B. & R.), but differs particularly in the form of the anterior foot-jaws, in the proportional length of the inner branches of the fourth thoracic feet, and in the form of the abdomen.

REMIGULUS *, gen. nov. (provisional name).

Body cyclopoid. Anterior antennæ short, six-jointed. Posterior antennæ three-jointed, without a secondary appendage. Mouth-organs rudimentary—the mandibles, maxillæ, and foot-jaws consist for the most part of simple stylet-shaped appendages. The first four pairs of thoracic feet have all the outer branches three- and the inner two-jointed. Fifth pair unbranched, two-jointed.

The genus *Remigulus* is provisionally instituted to include a curious cyclopoid copepod from Loch Linnhe, west of Scotland. The following is a description of the species:—

Remigulus tridens, sp. n.

(Pl. XI. figs. 15–20; Pl. XII. figs. 1–3.)

Basal joints of the six-jointed anterior antennæ armed with three prominent teeth (Pl. XII. fig. 1); when the animal is viewed from above the basal joints with their armature are entirely hidden by the boldly rounded forehead. The formula shows the proportional length of the joints of the anterior antennæ—

$$\begin{array}{cccccc} 7 & 10 & 12 & 4 & 5 & 6 \\ \hline 1 & 2 & 3 & 4 & 5 & 6 \end{array}$$

Posterior antennæ stout, the second and third joints subequal and shorter than the first; the second joint is more or less covered with cilia and armed with a stout hooked spine at the distal end; the last joint, which is narrower than the preceding one, bears four spiniform and geniculate terminal setæ. Mandibles and other mouth-organs as described in the generic definition (Pl. XI. figs. 17, 18, 19; Pl. XII. fig. 2). The first and second joints of the outer branches of the first pair of swimming-feet are furnished exteriorly with a marginal row of small teeth; the joints of the short and stout inner branches are subequal and are each provided with a plumose seta on the interior edge, while the second joint is strongly dentate on the outer margin and armed at the apex with two small hook-like spines. The inner branches of the next three pairs

* *Remex*, a waterman.

are comparatively slender and composed of two unequal joints, the first being only about half the length of the second. The first joint of the fifth pair is short, the second large and foliaceous, thickly covered with cilia, and furnished with four subterminal setæ. The abdomen and stylets together are only about one third the length of the cephalothorax. Caudal stylets nearly equal to the combined length of the last two abdominal segments. The base of the principal seta of each stylet is considerably enlarged and is articulated to the elongate slender distal portion.

Hab. Loch Linnhe (near the mouth of Loch Spelve), Argylshire, 1892.

Remarks. This curious species resembles some of the Lichomolgidae in general appearance, but it differs from anything known to us in the rudimentary structure of the mouth-appendages and in having the inner branches of all the first four thoracic feet two-jointed. Though obtained among dredged material, its structure clearly indicates semiparasitic habits similar to the Lichomolgidae and other closely allied forms; but its host is at present unknown to us.

The following interesting copepods have also recently been obtained:—

<i>Cervinia Bradyi</i> , Norman.	} Moray Firth (the last three were washed from <i>Filograna implexa</i>). Not previously recorded for the east of Scotland.
<i>Pterinopsyllus insignis</i> , Brady.	
<i>Misophria pallida</i> , Boeck.	
<i>Laophonte monensis</i> , I. C. Thompson.	
<i>Thalestris peltata</i> (Boeck).	

Caligidium vagabundum, Claus.

Caligidium vagabundum, Claus, Arbeit. zool. Inst. Wien, vol. viii. (1889) p. 367, Taf. i. figs. 1-7.

New to the British fauna.

One specimen of this curious species has recently been obtained among dredged material from the Moray Firth, depth 130 fath.

The structure of the anterior antennæ, with their extremely long filamentous hairs, and the structure of the posterior foot-jaws and first thoracic feet enable the species to be readily distinguished. The species was described by Dr. Claus from a single specimen in 1889 (see *op. cit.*), and, so far as we know, this is the only other record of its occurrence. Dr. Eugene Canu ('Les Copépodes du Boulonnais,' 1892, p. 255)

refers to Claus's specimen as a "unique exemplaire." We intend to describe and figure the Moray Firth specimen later on.

AMPHIPODA.

? *Cyproidia brevirostris*, sp. n. (Pl. XIII. figs. 1-11.)

Natural size 1.54 millim. ($\frac{1}{16}$ of an inch). Like *Cyproidia damnoniensis*, Stebbing, in general appearance. Cephalon about equal to the combined length of the first two segments of the mesosome. Rostrum triangular, short, not reaching to the penultimate basal joint of the superior antennæ; the rostrum, though small, is quite distinct. Second segment of the mesosome not more than half the length of the next. Eyes conspicuous, consisting of numerous lenses, the centre ones only appearing to be pigmented. Superior and inferior antennæ similar to those of *Cyproidia damnoniensis*, but no trace of a secondary appendage could be observed on the superior antennæ even with the aid of a Swift's $\frac{1}{5}$ -inch objective; the number of hairs on the first joint of the flagellum of the same antennæ is also greater and they are arranged in six pairs; each pair springs from a small papilliform base (fig. 2). The mandible-palp, if applied to the mandible, extends considerably beyond it, and is therefore proportionally much longer than the mandible-palp of *Cyproidia damnoniensis* (fig. 4). The first and second gnathopods are similar to those of that species, but the fingers are not serrate on the lower concave edge (figs. 5 and 6). The third and fourth pairs of coxal plates are greatly developed (fig. 1). The fourth pair is about one and a half times as deep as the corresponding segment of the mesosome; they also extend laterally beyond the sixth segment, and as their posterior excavation, which is comparatively narrow, is filled up by the fifth pair of coxal plates, the basal portions of the fourth and fifth pereopods are almost entirely concealed. Third pair of pereopods slender, basal joint of the last pereopods lamelliform, becoming wider towards the distal end, and produced downwards posteriorly to an acute angle (fig. 8). Uropoda and telson as in *Cyproidia damnoniensis*.

Hab. Moray Firth; washed from *Filograna implexa* from a depth of over 40 fathoms.

Remarks. This species resembles *Cyproidia damnoniensis*, Stebbing, in several of its characters, but it is at once distinguished by the great size of the third and fourth coxal plates. There are some other, but less obvious, points of difference, as, for example, the absence of a secondary appendage to the

superior antennæ, the peculiar arrangement of the hairs at the base of the flagellum of the same antennæ, the longer mandible-palp, and the form of the largely developed basal joint of the last pereopods.

As was pointed out by the Rev. Mr. Stebbing several years ago, there appears to be comparatively little difference between *Cyproidia*, Haswell, and *Stegoplax*, G. O. Sars. The only characters of any value that appear to separate the two genera are the apparent presence (*Cyproidia*) or absence (*Stegoplax*) of a minute secondary appendage to the superior antennæ, and the hands of the second gnathopods being larger than (*Cyproidia*) or similar to (*Stegoplax*) the hands of the first gnathopods; the difference of length of the rostrum can only be of specific value. The Moray Firth specimen, in possessing no secondary appendage to the superior antennæ, agrees better with Haswell's amended description than with that of the Rev. Mr. Stebbing, as well as exhibits a close affinity with *Stegoplax*.

EXPLANATION OF THE PLATES.

PLATE XI.

Diosaccus propinquus, sp. n.

- Fig. 1.* Female, seen from the side, $\times 40$. *2.* Anterior antenna, $\times 152$.
3. Posterior antenna, $\times 127$. *4.* Foot of first pair, $\times 84$.
5. Foot of fourth pair, $\times 84$. *6.* Foot of fifth pair, $\times 127$.

Laophonte littorale, sp. n.

- Fig. 7.* Female, seen from above, $\times 54$. *8.* Anterior antenna, female, $\times 190$. *9.* Foot of first pair, $\times 254$. *10.* Foot of fourth pair, female, $\times 254$. *11.* Foot of fifth pair, female, $\times 190$. *12.* Foot of fourth pair, male, $\times 254$. *13.* Foot of fifth pair, male, $\times 380$.
14. Appendage to first abdominal segment, male, $\times 253$.

Remigulus tridens, gen. et sp. n.

- Fig. 15.* Female (^p), seen from above, $\times 54$. *16.* Posterior antenna, $\times 190$. *17.* Maxilla, $\times 380$. *18.* Anterior foot-jaw, $\times 380$.
19. Posterior foot-jaw, $\times 506$. *20.* Foot of fourth pair, $\times 152$.

PLATE XII.

Remigulus tridens, gen. et sp. n.

- Fig. 1.* Anterior antenna, $\times 190$. *2.* Mandible, $\times 506$. *3.* Foot of first pair, $\times 152$.

Pseudocletodes vararensis, subgen. et sp. n.

- Fig. 4.* Female, seen from above, $\times 48$. *5.* Anterior antenna, female, $\times 253$. *6.* Posterior antenna, $\times 253$. *7.* Mandible and palp,

× 380. 8. Posterior foot-jaw, × 380. 9. Foot of first pair, × 190. 10. Foot of fourth pair, × 127. 11. Foot of fifth pair, female, × 190. 12. Anterior antenna, male, × 253. 13. Foot of third pair, inner branch only, male, × 190. 14. Foot of fifth pair, male, × 190.

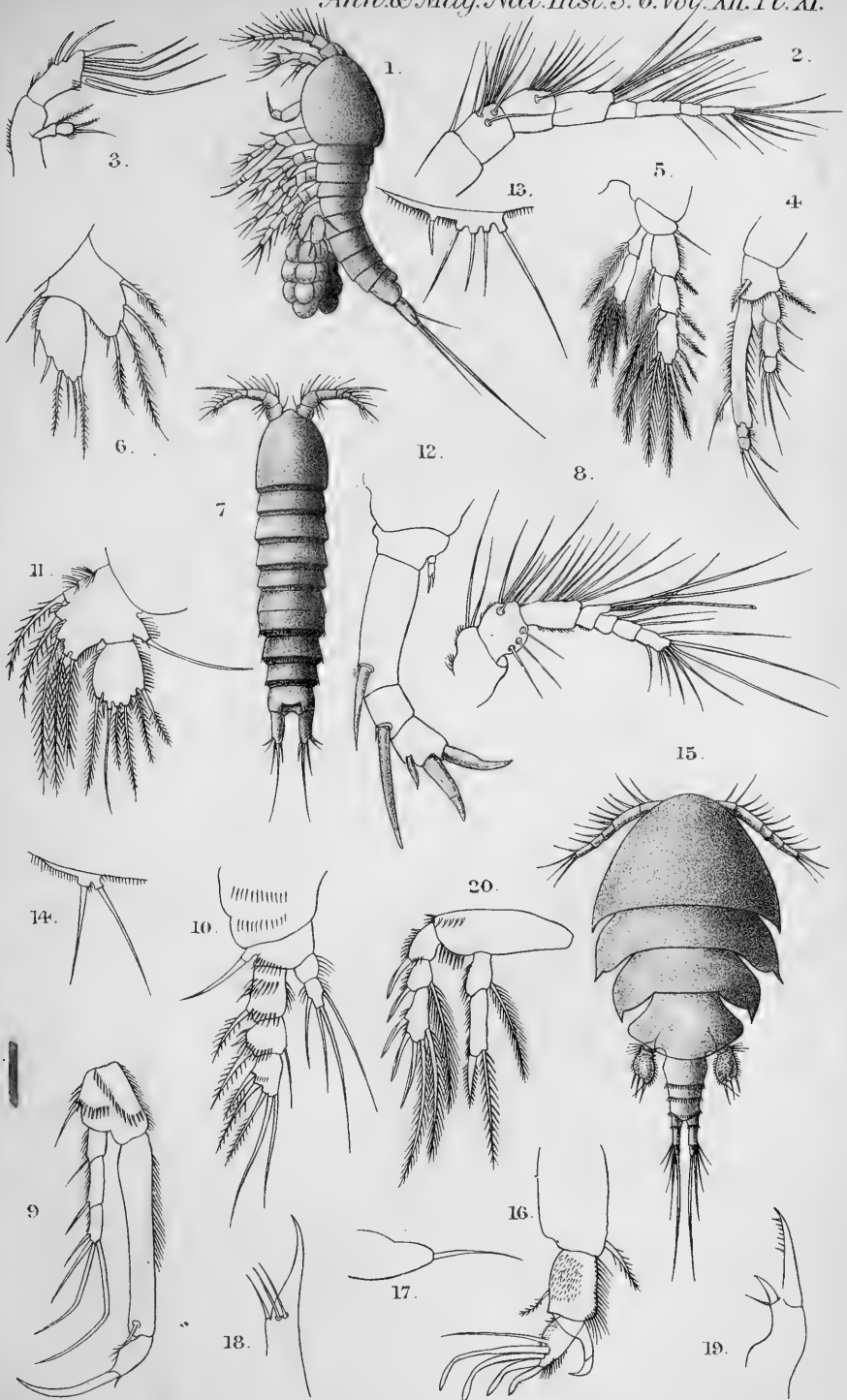
Pseudanthessius gracilis, Claus.

Fig. 15. Female, seen from above, × 40. 16. Posterior antenna, × 127. 17. Mandible and (*a*) maxilla, × 190. 18. Anterior foot-jaw, × 190. 19. Posterior foot-jaw, × 190. 20. Foot of fourth pair, × 127.

PLATE XIII.

? *Cyproidia brevirostris*, sp. n.

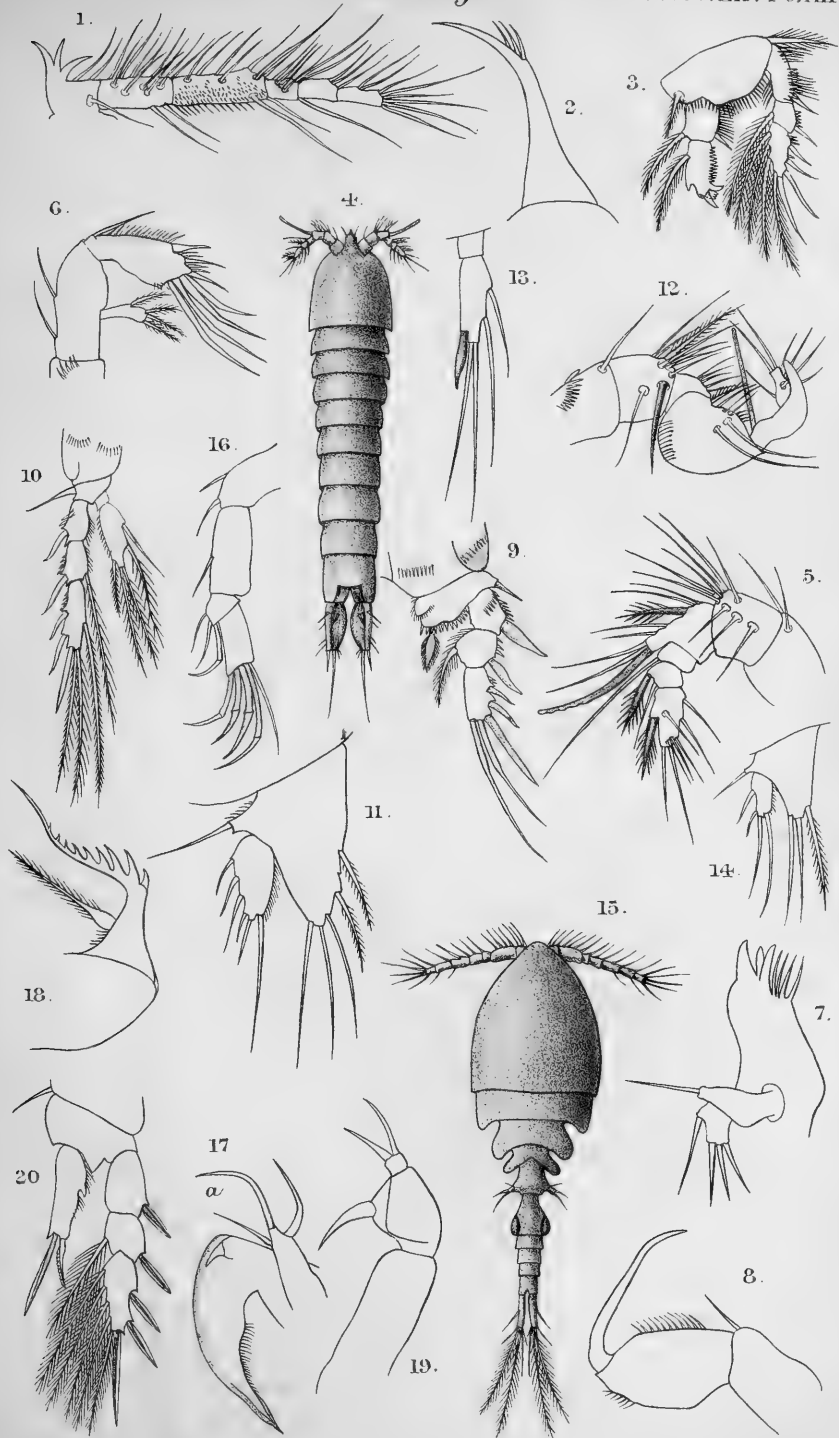
Fig. 1. Female (?), seen from the side, × 48. 2. Superior antenna, × 127. 3. Inferior antenna, × 127. 4. Mandible and palp, × 285. 5. First gnathopod, × 127. 6. Second gnathopod, × 127. 7. Third pereopod, × 95. 8. Fifth pereopod, × 95. 9. First uropod, × 127. 10. Third uropod, × 127. 11. Telson, × 190.



Andrew Scott del. ad nat.

Mintern Bros. lith.

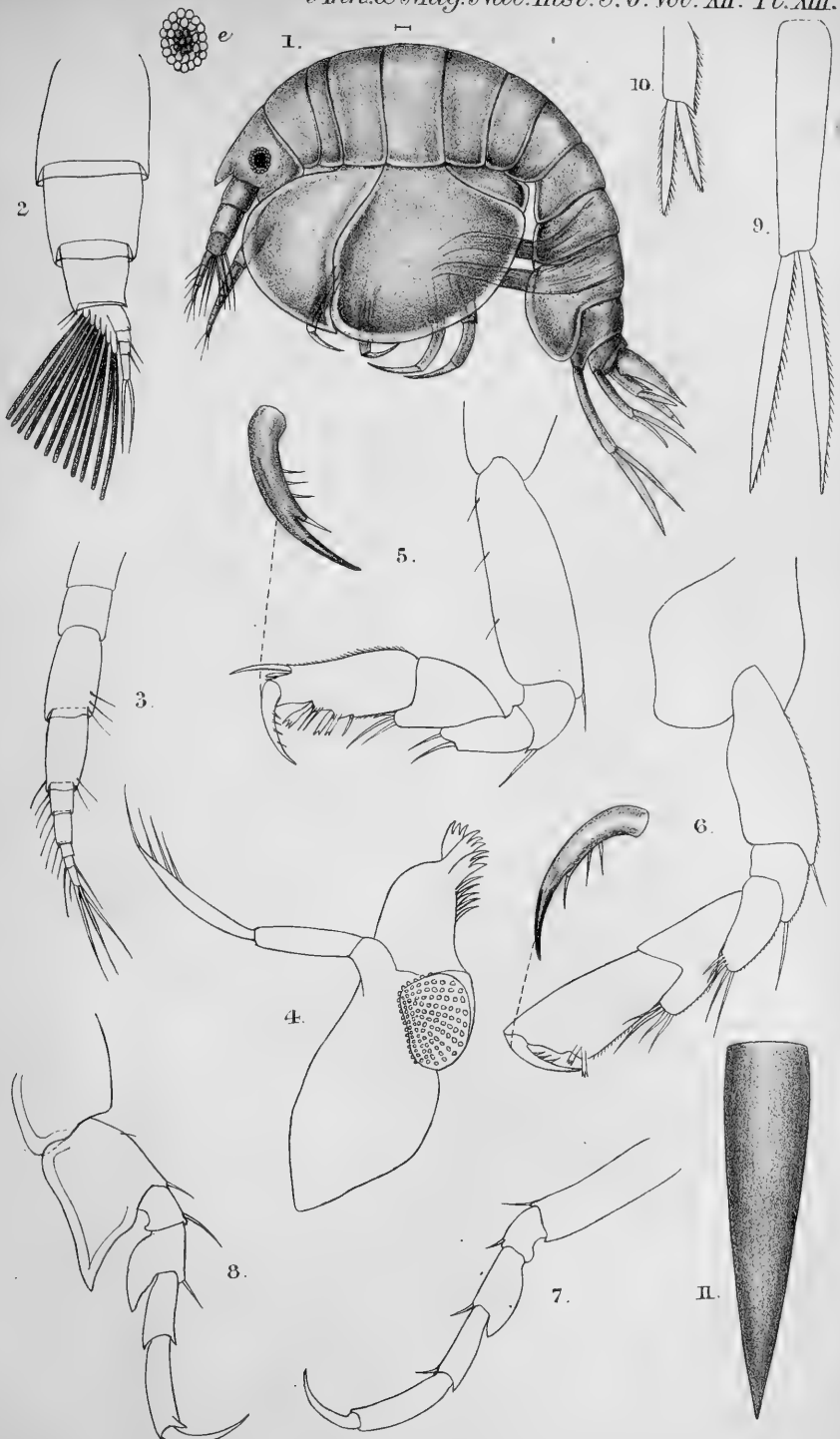
1-6. *DIOSACCUS PROPINQUUS*, n. sp. 7-14. *LAOPHONTE LITTORALE*, n. sp.
15-20. *REMIGULUS TRIDENS*, n. sp.



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CYPROIDIA BREVIROSTRIS, n.sp.



